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ABSTRACT

This paper discusses the development, application, and implications of a statistical technique--a concordance index--for measuring the restrictions and constrictions (legal and societal) which inhibit individual decision making and adapting behavior. It was found that as sophistication sets in there will be less and less tolerance of these restrictions, so that individual reaction to them will intensify until the governing entity is forced to relax the restrictions. It was also concluded that because zero-sum games (a form of competition in which one wins at the expense of another) narrowly restrict opportunities for decision making, human relations would benefit from a shift to non-zero-sum games. (The concordance index may be used for such fields as law, politics, economics, sociology, and psychology.) (JM)

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SOCIETAL BOUNDARIES ON

CYBERNETIC ACTION OR DECISION-MAKING

INTERNATIONAL ASSOCIATION FOR CYBERNETICS
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SOCIETAL BOUNDARIES
ON CYBERNETIC ACTION OR DECISION-MAKING

ABSTRACT

In a series of articles concerning adaptive and adapting behavior, Steg and Schulman pointed out that as society becomes more affluent, its members exhibit an adapting behavior phenomenon (changing the environment to suit their own requirements), regardless of the political orientation of the society. *

The main characteristic of adapting behavior is independent judgment. The question now arises: how far will any society, as presently constituted, enhance adapting behavior and inversely, how much will society restrict or constrict it?

Methods must be found for measuring societal restriction which are not a priori ethically necessary (we do not argue with the Ten Commandments).

Such measures must be differentiable and may possibly be culturally interchangeable. Schulman and Steg propose and posit a possible measure, a concordance index, which may be used for the fields of law, politics, economics, sociology and psychology.

INTRODUCTION

This study is concerned with the following queries:

- How does society enhance or restrict adapting behavior, behavior wherein a system changes or adapts the environment to suit its own requirements?
- Why develop measures of restrictions?
- If an index of restrictions is developed does it imply zero-sum games?

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* Education correlates with affluence at approximately +.98.

Some preliminary observations and definitions are useful:

- In contrast to adapting behavior, adaptive behavior is one wherein the system adapts itself to suit the requirements of the environment. [9, 10]

- Measures of restrictions are easier and qualitatively different to measure than enhancements. For instance, attempts to develop a measure of the quality of life by an index of discretionary income is very different from measuring the quality of life as measured by restrictions and censorship in the theatre, literature production, developments in art, music, and other communication media. Or, again, measures of disease, dis-ease, is much easier to develop than measures of good health.

- Ninety-eight percent of specific (non-performance) building codes are restrictions developed for the purpose of job maintenance.

TYPICAL MEASURES INCLUDE:

1. Societal legal restrictions on individual action.
2. Societal differentiation between classes, be they economic, racial, color, creed or sex, et al....., (intercultural differentiation).
3. Societal private enterprise or public restrictions and differentiation between and upon groups, (economic, political and social).

or, in other words:

1. legal restriction and differentiation.
2. regulatory or custom restriction in the public domain.
3. private enterprise restriction or public non-legal applicative restriction.

Although no descriptive measures are being propounded per se, general descriptive methods indicate the present status of possible analysis and would hopefully thus provide a framework for independent and future research.

Additionally, an evaluative framework might be obtained which would enable the investigator to perform an unbiased analysis of any social grouping.

We are not proposing to repeal the laws of supply and demand, nor any other basic laws endemic to economics. Nor, are we proposing to do violence to any societal method of holding property or religious constructs. State, individual or mixed ownership of property is irrelevant to the investigation, as is religion.

In previously written papers, Schulman and Steg, individually and together, have forecast an increasingly differentiated, pragmatic society in all developed nations, as soon as a given level of affluence is attained. They have also prognosticated heightened reaction, individual and group, to attempted restriction or regulation of behavioral patterns at any level. [9, 10]

We are attempting here to establish a possible method of evaluation of restrictions and constrictions on individual decision-making and suggest a technique by which this evaluation can be achieved. These suggested methods are surely not the only ones possible, but may form a point of departure for others.

METHODOLOGY

It is desired to measure the amount of restriction and constriction determined within the society itself, by legal, functional and structural requirements.

For this purpose, since an index of positive attributes ascribable to societal health and well-being is extremely difficult to obtain, we have attempted a reverse to an index of concordance, [8] first used in analyzing the specificity of building codes (i.e., their inefficiency in an economic sense) and their departure from performance codes [7]. The

statistical techniques used in information theory could then be applied in reverse.

The information can be quantified in two ways:

1. The number of independent parameters treated.
2. The number of discriminable steps within each parameter.

The larger the number of parameters treated by a law, code, regulation of custom, the more comprehensive it would be. The number of parameters would also indicate the number of degrees of freedom available to the individual.

The intersection of all parameters of all laws, codes, regulations or customs might be taken as an index of completeness; although another technique which might be applied (and which should be tested) is the use of any specific nation's laws, codes, regulations and customs as a "norm" and the other nations expressed as indices of the "norm".

Specificity might be measured by the number of divisions (discriminable steps) within each given parameter.

It is thought that the total information delivered by any nation may be some form of two possible mathematical functions:

(1) A log function of the form $Y = \log_k X$. In this case, the base would be the mean discriminable steps within the parameters of any given national standard and the minimum base would be two, although the problem of using alternatives as between standards would have to be met in such case.

(2) It is also thought that the total information delivered by any standard might be expressed as an exponential function $A = ae^{bX}$, in which case the function is probably an inverse exponential, and the degree of completeness would be related to the number of discriminable steps within each parameter.

Four indices might be developed (and other indices should probably suggest themselves during the course of the work) as follows:

1. Formal information content index (information being used in the engineering sense, as bit counting).

2. An index of specificity, with deviation from specificity expressed in terms of sigma (the standard deviation) or sigma squared (the variance).

In such case, sigma or sigma squared may well turn out to be an index of the degree to which the standards have been influenced by particular special interests.

3. A standard index of intersection of all parameters: or a norm index of comparison using other standards. Both of these types of indices should be developed to see which is the more statistically valid, and which creates the least bias.

4. An index of similarity between two standards, which would be a measure of agreement of the intersections of the specific parameters, multiplied by the coefficient of correlation or the index of determination between the ordering of the alternatives within the respective parameters. Whether or not the coefficient of correlation

or the index of determination would be used as a weighting, would depend again upon the suitability of the specific measures, proven by testing and their lack of bias.

RESTRICTIONS AND CONSTRICTIONS

A. Legal restrictions and constraints

1. Physical environmental restrictions

a. non-performance building codes

(i.e., must have specific kind of basement
must have specific flooring
must have specific plumbing, piping)

b. zoning regulations

1. exclusionary residential zoning regulations (i.e., 1-acre lots a minimum for building)

2. restrictions on cluster housing, on adequate land use, etc.

3. refusal to allow contemporary architecture.

4. restriction on aesthetic development: Cape Cod, Massachusetts.

2. Food

a. lack of packaging codification

b. lack of laws specifying contents of marketed products (i.e., laws must require information, not restriction on information, so decision-making is possible).

3. Clothing

a. illegality of nudity on beaches, etc.....

b. lack of information in many societies on clothing textile content.

4. Other personal conduct restrictions

a. sexual restrictions

including...
- o abortion laws
- o divorce laws
- o lack of family allowance
- o required registration of illegitimacy
- o restrictions on sex education
- o severely limited access for exercise of nudity privilege.
- o sexual activity laws
- o welfare code (man must not be living at home)

b. restrictions on personal conduct

c. any travel restrictions internal or external

1) world-wide legal restrictions on aliens
(Note: No country can survive opening its borders if it is done on an individual basis only)
immigration or emigration restrictions

2) legal harassment of aliens by continuous forced alien registration.

d. any non-choice work specification for living allowances (this does not include paid insurance benefits)

e. any citizenship specification for working, except for governmental employment (this does not include tourist or visitor status)

f. forced carrying of identification card except for usage in emergencies

g. forced registration of citizens

h. legal restrictions on changing residences

i. legal code restrictions on non-licensed performance

1) i.e., man not allowed to install own plumbing or electric wiring even if it meets code requirements.

2) legal monopolization of certain services; i.e., telephone, utilities (not water and sewage, since that required sewage systems).

j. world-wide legal tariffs and quota restrictions on trade, and discrimination against goods if they are not owned by citizens.
(Note: No country can individually attempt to dissolve these.)

k. 1) legal restrictions on communication and information on so-called "grounds" of national defense

2) national restrictions on release of scientific information and personnel - non-defense related
(Note: No country can do this alone.)

l. censorship - may be zoned, but not totally
(i.e., restrict it for children, thus not have it available in certain areas)

m. legal tax discrimination against any type of income
i.e., all income should be taxed identically

n. confiscation of savings

B. Societal restrictions and contraints (non-legal)

1. Job discrimination . . . labor union discrimination
unreasonable dues or membership fees
unreasonable apprenticeship
testing restrictions

2. Affiliated group discrimination

a. non-performance group restrictions on admissions to professions or employment.

[must go to an accredited law school before being allowed to take the Bar Association exams (ibid., for medicine, dentistry, druggist, etc.)]

b. license revocation for political reasons

c. 1. educational access revocation for political, religious, or racial reasons

2. lack of educational access and constraints by public institutions for racial, religious, or sexual reasons

3. allowable constraint by private institutions acceptable only if not publicly funded, or indirectly subsidized by tax grants or exemptions

d. forced religious education and discrimination (sometimes out of sheer ignorance) [Saturday classes for Jewish children; Spain]

e. deliberate withholding of public funds for education and restriction on size of facilities and programs to limit education (all of Western Europe, Russia, Asia, etc....in U.S. also, though not so pervasively)

f. limitations on competition and/or on cooperation on any grounds except those of public health and welfare

1. i.e., monopoly franchises.

2. forced cartelization of major industries.

g. regulatory restrictions on the formation of groups, clubs, and associations (other than necessary restrictions for tax-exempt status.)

h. forced restriction by a firm on an industry

C. Societal enterprises - private and/or public restriction

1. Any non-performance employment discrimination or on upgrading of employment by individual or government businesses (Russia and Jews, South Africa and blacks, Americans and Indians, Africa and East Indians, and recently Middle Africa and Asiatics and Caucasians.)

2. Forced ghettoization of any group through discriminatory charges or non-availability of facilities.

3. a. discriminatory charges and overcharges

b. quotas: (any quota is discriminatory)

4. a. group isolation in public places

b. group denial at any publicly opened facilities, even if privately owned

c. group segregation at any publicly opened facilities even if privately owned

5. Differential societal restrictions by groups

- o different zoning restrictions for the poor
- o more bars in poor neighborhoods
- o less public amenities for poor neighborhoods
- o fewer public amenities and facilities in poor neighborhoods per person

Detailed Taxonomic Framework

The following is a partial taxonomic framework for one sub-area of legal restrictions and constraints, the area of physical environmental restrictions:

A) non-performance building codes

B) zoning regulations

Within area A*:

- construction - over 500 regulations
- electrical code - over 2000 regulations
- fire - over 200 regulations
- heating - over 300 regulations
- height and depth - over 10 regulations each
- plumbing - over 600 regulations
- sanitation - over 100 regulations

Total - over 3,710 regulations

Within area B:

1. Exclusionary residential zoning regulations

   - access
   - land acreage
   - price of home
   - size of home

   Total - 4 laws with over 10 restrictions each

2. Restrictions on cluster housing, on adequate land use, etc. ...

   i. e.,
   - attached and unattached garages
   - backyards between homes and garages
   - basements
   - baths
   - height of ceiling to size of room
   - kitchens
   - outside and inside stairs
   - porches
   - space between houses
   - type of facility
   - type of house
   - type of plumbing
   - windows, doors, etc.
   - front yard - sidewalk distance

   Total - 14

3. Refusal to allow contemporary architecture

   Total - 1

* City and County of Philadelphia, Pennsylvania.

4. Restriction on aesthetics

. law requires that design must pass board of supervisors

Total - 1

There are at least three types of additive matrices:

a. an item scale matrix - Table I

b. an order scale matrix or severity index - Table II

c. a number scale matrix - Table III

Using the Philadelphia SMSA (Standard Metropolitan Statitical Area) as an example, for physical environment, triangulation of the three types of matrices would produce the following:

TABLE I

Examples of Number Scale Additive Matrix of Laws of Codes Governing Physical Environment (Suburban County)* [*1]

Designation/General	General	Subclasses	Σ
Zoning Exclusionary	4	20	24
Restrictive Land Use	4	15	19
Architecture	1	30	31
Esthetics (Lawns, garages, etc.)	15	70	85
Σ	24	135	159

Index of restriction = 24 - 135 = -111

*1 These codes are used to maintain income segregation. In the U.S. this is now being appealed.

TABLE II

Example of Average Order Scale Additive Matrix to Obtain Severity Index
(based on Number Scale Matrix, Order 1-10) [1]

Designation \ General	general w_i	general x_i	subclass w_i	subclass x_i	$\Sigma w x_i$	$\bar{X}_i \left(\frac{\Sigma w_i x_i}{\Sigma x_i}\right)$
Zoning Exclusionary	7(2)	4	9	20	208	208/24
Restrictive Land Use	10(3)	4	6	15	130	130/19
Architecture	8	1	2	30	68	68/31
Esthetics	4	15	5	70	410	410/85
	29	24	22	135	816	816/159
$\Sigma \bar{X}$	136/24		680/135			816/159

(1) Average Severity or

$$\bar{X} = \sum_{i=1}^{n} w_i x_i \Big/ \sum_{i=1}^{n} x_i = \frac{816}{159} = \underline{\underline{5.13}}$$

where w_i = severity weighting for the code
x_i = specific code

Thus we now obtain an index of severity that can be applied in all cases.

(2) i.e., no permit shall be given for a single story dwelling, no carpets, etc.....

(3) i.e., no house shall be built on less than 2 acres

TABLE III

Example of Item Scale Additive Matrix for City & County of Philadelphia Plumbing Code*[2]

Sub-Chapter No.	Total Cenera Designation	General Classes	Subclasses	Σ Classes	Performance Codes	Specific Codes	Σ Codes
300	Materials	3	52	55	6	56	62
400	Joints	9	20	29	2	24	26
500	Traps & interceptors	14	83	97	20	70	90
600	Pipe Support & protection	8	19	27	19	3	22
700	Fixtures	19	129	148	4	76	80
800	Water Supply & distribution	15	78	93	17	75	92
900	Soil & water Piping	7	82	89	15	85	100
1000	Storm water drainage piping	6	41	47	14	39	53
1100	Vents & Venting	9	46	55	10	48	58
1200	Indirect & Special wastes	6	18	24	10	5	15
1300	Indiv.water supply systems	3	0	3	3	0	3
1400	Indiv. sub-surface sewage disposal syst	13	57	70	10	85	95
Σ		112	625	737	130	566	696

Index of Specificity = 130-566 = -436

* Note that all performance codes (specific codes) are strictly for the purpose of job maintenance; i.e., copper pipes specified in an area where high temperature plastic already tested in atomic submarines would be infinitely superior.

DISCUSSION

It is increasingly realized that power over nature is "something which mankind can collectively increase and has increased for the last half-million years." This is a variable-sum game, since it is a transaction in which players can compete with one another yet all can win jointly at the expense of nature. All can profit from the development of irrigation for instance, as all can lose by soil erosion. Yet, when consideration is given to power over men, then, historically this has been characterized as a zero-sum game. Thus, Machiavelli stated that "a prince who advances another prince's power diminishes his own".[3] Zero-sum games are a merciless form of competition and usually the contest has no end.

At present, societal restrictions and constraints are based on allowing a person or group to protect themselves by restricting the activities of another or others. These are thus also zero-sum games. These restrictions allow benefits to accrue to some at the expense of others. When restrictions are placed on the activities of others, then opportunity for decision-making, or independent judgment is being limited.

When non-zero-sum games are involved, opportunities for decision-making and for activity are not so narrowly restricted or limited. Non-zero-sum games are beneficial to all parties of the transaction or to none. What is needed in human relations is a shift from a zero-sum perspective to a non-zero-sum perspective.

Note that past, as well as present constraints, are established on the assumption that men were or are not capable of, or would be dangerous when or if allowed to make independent decisions. Such a view reflects a negative and cynical appraisal of man and his ability for wise self-government. (Although E.B. White can certainly speak for all of us, when he says: "I hold one share in corporate earth, and I'm uneasy about the management.")

It is sad to report that today the vast majority of the world's nations still have political structures that severely constrain individual decision-making for judgment, reflecting these nations' underestimation of their body politic. This does not imply that the opposite assumption, the Rousseauistic one, of man being born good and it is society that renders him evil, is the alternate tenable assumption. For then one turns to "total freedom" which is anarchy, as the modus operandi. People can share in the benefits of power over men "to the degree that men expand their capacity to act, to do things, to coordinate their behavior, or to comply with other people's wishes." [3]

Deutsch's example is quite appropriate. Tyrants who rule millions of powerless illiterates have less power to affect events than a democratic ruler who governs a million high school graduates. One need not stop at the obvious that high school graduates can do more things than an illiterate populace. What is critically distinctive "is the greater experience that a democratic country gives its people in making their own decisions and in thinking and acting for themselves." [3] This is as good a definition of democracy as any.

The notion of a hierarchy of values such as Maslow's must also be reviewed. Thus for Maslow, primary needs are for food, shelter, clothing and so on. Further on one looks for self-actualization. Yet, in concentration camps, those prisoners who tended to survive were the ones who shared, protected and helped the other prisoners. [4]

An example, drawn from the history of the United Automobile Workers Union, can illuminate a bitterly fought innovation. In 1955, in the union contracts with the Big Three of the automobile industry, Walter Reuther forced the acceptance of the establishment of an industry-financed fund to supplement state unemployment insurance payments. The heads of industry saw this as an action wherein workers won benefits at the expense of the consumer. In 1975, over ten years after Reuther's tragic death, "the country got an impressive demonstration of one ... legacy as a force for social stability ... since, in the meantime, the Reuther breakthrough spawned similar funds in steel and other basic industries..." [6] Thus, when in 1975 unemployment crossed the eight-million mark, and the area worst hit was Detroit and other mass-production centers, "the absence of rioting and hunger marches was, in important measure, attributable to (this) safety valve..." [6], to this bitterly fought breakthrough.

The heads of industry had objected vehemently that Reuther was destroying the free enterprise system. With the fund supplement, which was continuously increased over the years, idle workers received now roughly an amount equal to their normal take home pay. More than a half-billion dollars of extra cash was given to the jobless unionist during the recession. The Reuther breakthrough operated as a bulwark against violent upheaval in the worst downturn since the great depression.

Rather than destroying the free enterprise system, Reuther saved it with his "shining vision" of labor and technology harnessed "to the conquest of poverty and the service of universal well-being" [6].

To conclude this revealing event, one needs to emphasize that "it was precisely such extensions in the horizons of collective bargaining that so regularly caused industrialists to list Walter Reuther as ("the most dangerous man in America") [6]

Clearly, this summarizes how far from the jungle we have traveled, thanks to laws of course:

"Cooperation is...the most deeply rooted theme running through the success of man. This is demonstrated by the enormous...strength in adulthood we derive from prolonged dependent weakness during infancy and childhood. This is demonstrated by the confidence with which we eat food prepared by total strangers, accelerate without looking when the light turns green, and relax trustingly beneath the knife of a surgeon we may barely have met. This is demonstrated by our efficient collaboration in control of epidemics and disasters, supervision of peaceful commerce, and a beginning of arms control." [5]

We are looking for an underlying synthesis of value implicit in the law or ethical system. We cannot measure value positively because it is a culturally normative statement, but we can measure negations or deviations of values across cultures. This can be done following the matrix as a yardstick.

We now have a system of comparisons which does not negate the fact that one system of values may not equal another system of values, but instead points up the difference.

In the United States we may consider housing restrictions less important than personal restrictions, and in the USSR personal restrictions may be considered a positive benefit. Yet, both are restrictions and interfere with individual actions.

We can then be accused of postulating an absolute, teleological system. This in no way detracts from the fact that it can be used for comparison purposes.

CONCLUSION

There are indeed statistical techniques that can be used to measure how a society restricts adapting behavior, or decision-making. Indices are developed above. We can, for instance, plot United States cities by the number of building codes and follow the same methodology cross-culturally plotting personal restrictions and interferences with individual actions. Other measures may be culturally independent. For instance, bureaucracy can be considered a restriction in a planned as well as in a non-planned economy.

Specific types of restrictions and constrictions, both legal and societal differentiations, inhibit the formation of individual judgment. As sophistication sets in there will be less and less tolerance of these restrictions and while they do not represent basic valuational changes, nevertheless, individual reaction to them will intensify to the point where the governing entity will be forced by counteraction, interaction or overt conflict, first to appease one group, then another, to the point where restrictions will relax.

Furthermore, exclusions inhibit the ethic of communal assistance, and cooperative effort.

Additionally, the above methodology enables us to evaluate comparative social groupings.

We also conclude that zero-sum games are appropriate, possible, or necessary, if one can term it that, only in finite one-dimensional situations, only where the situation is truly finite; for instance, the case of a meter stick. However, there are very few finite one-dimensional situations in any complex system. Zero-sum games are thus highly artificial. Zero-sum games do not exist in complex systems. And, to paraphrase Wiener, life is not zero-sum games.* In all non-finite situations, non-zero-sum games are then the order. Several examples were dwelled on, including one case specifically, to indicate that what may appear to be initially a zero-sum game turns out to be indicative of a non-zero-sum game.

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* Personal communication, in the early 1960's.

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